

## GRANITE INDUSTRY ✓

## SYNOPSIS OF FILM

1. In the Granite Quarry, showing Granite Formation.
2. Derricks Lifting Huge Blocks of Granite from Quarry.
3. Drilling Holes for Blasting. Steam Drill and Workmen.
4. Close View of Drill.
5. Carrying Blocks to Work Sheds. Cartload of Granite Drawn by Four Horses.
6. Sawing Granite. Steel Bars Moving in Sand and Water Cut the Blocks into Slabs.

## Finishing Processes

7. Squaring the Edges by Hand.
8. Smoothing or Levelling the Rough Surfaces by Machine.
9. Polishing by Hand and by Machinery.
10. Turning Marble Column on Lathe.
11. Carving a Fluted Column by Hand.
12. Carving a Decorative Cornice with Air Chisel.

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ACCORDING to Gannett, Garrison & Houston the rocks of the earth's crust are classed as:

1. Igneous, those which have cooled from a molten state such as lava and some varieties of granite and similar rocks.

2. Aqueous or stratified, those deposited in horizontal strata or layers as sediment in the ocean or lakes or by rivers. Shales, limestone, and sandstone belong to this group.

3. Metamorphic, those originally of igneous or aqueous origin which have become changed (metamorphosed) by the action of heat, moisture and pressure. Marble and schists are metamorphic rocks. When carried to an extreme, these changes have crystallized the rocks and removed all traces of stratification."

Granite is a rock of igneous origin, consisting chiefly of the minerals: quartz, feldspar, and mica. It is the result of the slow cooling and crystallizing of glass-like matter, maintained in a molten condition below the earth's surface and driven outward by great pressure from beneath against the less, but still very great, pressure of overlying rocks. The molten rock is usually sufficiently voluminous to prevent rapid cooling. The crystals of granite indicate the presence of superheated water and enormous pressure in its formation. (A cubic foot of water weighs  $62\frac{1}{2}$  pounds and a cubic foot of granite averages 165 pounds). Though granite may now appear at the surface of the earth it is always formed below the surface. In many cases the overlying rocks have been removed by erosion through great periods of time.

Granites differ much in the texture of their minerals. Some are fine and others extremely coarse. This is sup-

posed to have been caused by the rate at which they cooled, the finer granites having cooled more quickly than those with coarser crystals.

Though usually gray, granites of other colors are often seen. Some granites have a reddish hue, while others have a blue, brown or green tint. This is due to the different forms of feldspar which is the most abundant mineral in granite.

Quartz also can readily be distinguished. Harder than feldspar, it has a bright luster, breaks unevenly and is usually glassy and brittle. Its color may be bluish or smoky which to a small extent determines the shade of the granite.

Mica is the next abundant matter in granite. It is soft and splits in thin elastic leaves. It is of two colors, white and black. The presence of black mica in granite is especially noticeable. All granites are not exactly alike, and those from different sections have different proportions of these constituent minerals.

Granite of good quality is widely distributed in all countries, but it is quarried only in those places where there is demand for it, where means for getting it are cheap and efficient, and where transportation is cheap and easy.

Although marble has been used for many centuries, it is only within the last hundred years that the use of "dressed" granite has become general. Granite is much harder than marble and is not as easily worked. The methods and tools in use a century ago made granite so costly that few granite buildings were erected. Improved methods and machinery, however, have reduced the cost of cut granite so that its price now compares favorably with that of other and less durable building stone. It is now largely replaced by cement, the use of which has caused many granite quarries to be abandoned.

In the film illustrating the granite industry, we have a general view of a granite quarry near Concord, New Hampshire. A close view shows the face of the rock after blocks of granite have been removed. A steam drill, supported in a movable arm, is now seen. A series of holes is drilled along a line, all to the required depth. Then small charges of powder or dynamite are placed in the holes and electrically fired so that the rock splits along the line of these holes. The pictures indicate the depth to which the holes have been bored and show the "cleavage" of the granite.

Granite quarries are always situated on hillsides. A four-horse wagon is shown, conveying granite blocks to the workshed near the foot of the hill.

Here the granite is taken in hand by the workmen and undergoes different operations before it is ready for the use to which it is to be put. As the blocks are delivered, they are "edged"; that is, they are squared, then smoothed by an automatic hammer, illustrated by the next two scenes and finally may be polished. The polishing is done either by hand or machine, both methods being shown here. Granite building and paving blocks are only edged and rough-dressed.

When used for ornamental or decorative work, the granite may be turned on a lathe, chiseled by hand, or by an air chisel. Two views are given of a short column being turned in a lathe, the grinding wheel throwing off great quantities of granite in the form of dust. The large pillars are made in sections and hand chiseled. The air chisel is also seen at work on an ornamental cornice, and the closing picture is one of a cornice ready for use.

## QUESTIONS ON THE FILM

1. Describe appearance of the granite quarry.
2. Describe the process of drilling holes in granite. Why are they made?
3. Why does the granite split evenly?
4. How does an air chisel work?
5. How is granite polished?
6. By what different methods is it carved?
7. Describe the processes by which a cornice is made.



## QUESTIONS, TOPICS, SUGGESTIONS

1. Have the pupils bring to class, specimens of granite. Show them the feldspar, quartz, and mica.
2. Tell what buildings in your town or city are made of granite.
3. For what purposes is mica used? Where is it obtained?
4. What qualities has granite which make it suitable for buildings? For monuments? For paving stones?
5. Name states in which granite is extensively quarried.
6. Compare granite and marble as to cost, durability, abundance, ease of working, finish.
7. What is cement? Tell what you can about its use, cost, durability.

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